

AN ENVIRONMENTALLY-FRIENDLY TECHNIQUE AGAINST WATER DEFICIT AND SALINITY

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Why grafting technique?

- It could allow to combine desired shoot characteristics with root features to overcome environmental stresses
- It can be an adaptation environmentally-friendly strategy in agricultural production systems



ROOTSTOCK
Capsicum spp.

Robust rootstock
Tolerant to environmental stresses
Exogenous hormones source

SCION

Capsicum spp. (*annuum*)

Commercial cultivars with desired fruit characters

Handicaps

- This practice is still limited in grafted peppers plants because:
 - There are very few commercial pepper rootstocks
 - Available rootstocks are sensitive to abiotic stresses
 - Some plant combinations are incompatible; pepper plants can only be grafted onto other pepper plants

AIMS

To find tolerant pepper accessions to water deficit and salinity to be used as rootstock

-Increasing pepper yields and improving fruit quality

Grafting easily

-Being compatible with most of commercial pepper plants (scion)
-Growth rate like scion

Increasing knowledge about physiological responses under abiotic stresses

-Accelerating the selection process

STAGES OF THE STUDY

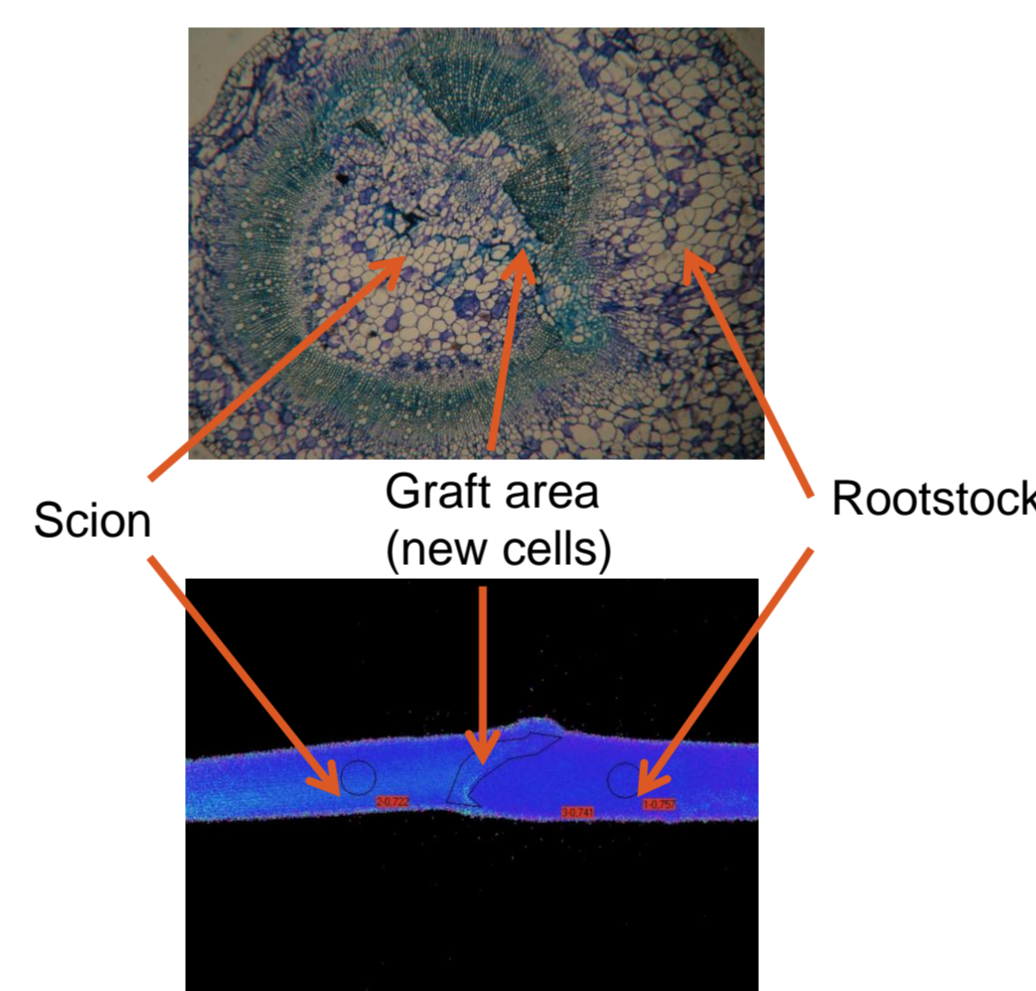
Identify tolerant accessions to be used as rootstocks

- Germplasm Bank
- Comparing between commercial pepper rootstocks



- Microscopy
- Chl fluorescence imaging such a rapid and non-invasive technique

Study of the compatibility between scion and rootstock



Influence of the rootstock on scion in:

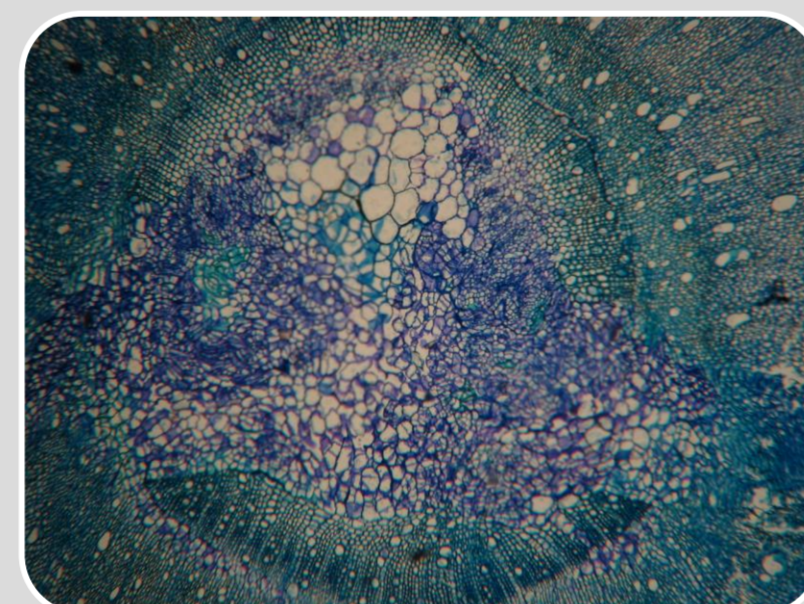
- Photosynthesis
- Antioxidants
- Nutrients
- Osmotic adjustment
- Enzyme activities
- Hydric relations
- Yield
- CFI



RESULTS



After 2 screening along 2 years WERE FOUND:
- 8 tolerant accessions to both deficit hydric and salinity to be used as a rootstock



After more than 30 plant combinations (scion/rootstock) measured WERE DETECTED:
- The 5 genotypes most compatible



Tolerant Rootstock/Scion physiological characteristics WERE:
-↑Photosynthesis
-↑Proline
-↓[Cl⁻] (exclusion)
-↑[Na⁺] roots (retention)
-↑Ψ_s
-↓Ψ_w

POTENTIAL PERSPECTIVES

Expanding the variability obtaining hybrids crossing the most tolerant accessions with the best performance

Noting the most significant characters of past experiments
Searching for molecular markers

- Extending growing areas
- Maintaining yields in saline areas and/or water scarcity

REFEREED JOURNALS

Some rootstocks improve pepper tolerance to mild salinity through ionic regulation. Consuelo Penella, Sergio G. Nebauer, Ana Quiñones, Alberto San-Bautista, Salvador López-Galarza, Ángeles Calatayud. *Plant Science*. 2015. 230, 12-22. DOI: 10.1016/j.plantsci.2014.10.007

Evaluation of some pepper genotypes as rootstocks in water stress conditions. Consuelo Penella, Sergio G. Nebauer, Salvador López-Galarza, Alberto San-Bautista, Adrián Rodríguez-Burruero, Ángeles Calatayud. *Horticultural Science*. 2014. 41, 192-200

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Evaluation for salt stress tolerance of pepper genotypes to be used as rootstocks. Consuelo Penella, Sergio G. Nebauer, Salvador López-Galarza, Alberto San-Bautista, Elisa Gorbe, Ángeles Calatayud. *Journal of Food Agriculture and Environment*. 2013. 11, 1101-1107. DOI: 1111:1101-1107